

Conclusion. The cutoff value of ASMI ($< 4.8 \text{ kg/m}^2$) defined as two SD below the mean of reference young population was lower in this study compared with the Rosetta Study ($< 5.5 \text{ kg/m}^2$). As for the sex specific cutoff (ASMI $< 5.7 \text{ kg/m}^2$), this index was similar to the data of the Health ABC study ($< 5.67 \text{ kg/m}^2$) (EWGSOP, 2010). The mean frequency of sarcopenia in Ukrainian older women was 21.3 %.

ROLE OF OXYGEN-DEPENDENT TRANSCRIPTION FACTORS IN ADAPTATION OF ELDERLY PREDIABETIC PATIENTS TO INTERMITTENT HYPOXIA

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Metabolic disorders represent one of the major health and economic burdens for modern society. Recent evidence suggests that hypoxic exposures might provide a cost effective strategy for improving metabolic functioning. Intermittent hypoxia training/treatment (IHT) modulates lipid and carbohydrate metabolism through the changes in expression of HIF-1 α and its target genes that play a key role in the regulation of glucose homeostasis.

Aim. To explore effects of a two-week IHT on mRNA expression of HIF-1 α and its target genes: pyruvate dehydrogenase kinase (PDK1), insulin receptor (INSR), facilitated glucose transporter — solute carrier family-2 (SLC2A1), and transient potassium channel (KCNJ8) in healthy humans and patients with prediabetes.

Methods. Seven healthy volunteers of 44–68 years old (Gr I) and 15 prediabetic patients of 48–70 years old (Gr II) participated in the study. Gr II included subjects who had impaired fasting glycemia, glucose intolerance, or their combination. They were divided into two sub-groups: Gr IIa — experimental IHT group (11 subjects), and Gr IIb — sham IHT group (4 subjects). All participants were studied before IHT, after 3rd and 14th days of IHT program and in a month after IHT termination. Every IHT session consisted of four 5 min bouts/d of breathing 12 % O₂ with 5 min breaks. In dynamics of IHT, mRNA expression was determined in blood leukocytes using real-time PCR.

Results. Two-week IHT course reduced significantly fasting and 120 min post-OGTT glycemia in Gr IIa, this reduction was maintained through a month after IHT termination. Acute hypoxic test (AHT) revealed a significant increase in tolerance to hypoxia. Shortened recovery time, more effective functioning of respiratory and cardiovascular systems during AHT was also registered in patients of Gr IIa. Initial levels of mRNA expression of HIF-1 α , SLC2 and KCNJ8 were the same in Gr I and Gr II, however, PDK1 and INSR were 2-fold higher in Gr II. IHT resulted in 4-fold (Gr I) and 6-fold (Gr IIa) increase in HIF-1 α during 3rd (Gr I) or 14th (Gr IIa) days of IHT, the latest remained twice higher in a month. A similar pattern was observed with respect to PDK1. The greatest increase in INSR, SLC2 and KCNJ8 expression in both groups was observed in a month after IHT termination. Correlation analysis showed that higher expression of HIF-1 α , INSR and SLC2 determines a higher resistance to hypoxia.

Conclusion. This pilot study has shown that IHT has positive effect on carbohydrate metabolism in patients with prediabetes. Oxygen-dependent transcription factors are actively involved in this process.